



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

NICOLE MAJESKI
SECRETARY

April 28, 2022

Mr. Alex Meitzler, P.E., PTOE
Traffic Planning & Design, Inc. (TPD)
111 E. Main Street, Suite A
Elkton, Maryland 21921

Dear Mr. Meitzler,

The enclosed Traffic Impact Study (TIS) review letter for the **4002 S. DuPont Highway Royal Farms #459 Camden** (Tax Parcel: 7-00-09415-04-0201-00001) development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2124.

Sincerely,

Claudy Joinville
Project Engineer

CJ:km

cc with enclosures: Mr. Jeff Bainbridge, Two Farms, Inc.
Mr. Edward F. Farrell III, BL Companies
Mr. William McAnally, BL Companies
Ms. Abigail Meyer, Traffic Planning & Design, Inc. (TPD)
Mr. Jason Berry, Kent County Department of Planning Services
Mr. Andrew Parker, McCormick & Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary / Director, Transportation Solutions (DOTS)
Pamela Steinebach, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Todd Sammons, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Matthew Lichtenstein, Central District Engineer, Central District
Erin Osborne, Central District Public Works Manager, Central District
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Olayiwola Okesola, Kent County Review Coordinator, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Joshua Schwartz, Subdivision Manager, Development Coordination
Annamaria Fumato, Project Engineer, Development Coordination



April 28, 2022

Mr. Claudy Joinville
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1946F
Traffic Impact Study Services
Task No. 3A Subtask 03 – Royal Farms No. 459 Camden

Dear Mr. Joinville:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Royal Farms Store 459 – Camden development prepared by Traffic Planning and Design, Inc., dated January 27, 2022. Traffic Planning and Design, Inc. prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Royal Farms Store No. 459 – Camden development, proposed to be located at the southwestern corner of the intersection of US Route 13 (S. DuPont Hwy) & Voshells Mill Road (Kent Road 105) / Voshells Mill Star Hill Road (Kent Road 360) in Kent County, Delaware. The proposed site would consist of a 4,649 square-foot super-convenience store with gas. The proposed Royal Farms would replace two existing retail buildings totaling 10,400 square feet. Two unsignalized access points are proposed: one full access on Voshells Mill Road and one rights-in/rights-out access on southbound US Route 13. If built, construction of the proposed Royal Farms would be anticipated to be complete by 2023.

The subject land is located on an approximately 2.03-acre parcel. The subject land had been zoned BG (General Business), and the developer does not plan to rezone the land.

Currently, there is one corridor capacity program and four active DelDOT Capital projects within the study area. None of the projects are expected to be constructed before the Royal Farms would be completed.

The corridor capacity program is DelDOT's Corridor Capacity Preservation Program (CCPP), a statewide program intended to sustain the through capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, including this section of US Route 13, are able to efficiently carry regional traffic without impedance from the effects of local development. The first two active projects below (the HEP projects) are tied to goals of the CCPP.

The first active DelDOT project is *HEP, KC, US 13, Lochmeath Way to Puncheon Run Connector* (State Project No. T201500202). This project seeks to widen US Route 13 to provide a third



through lane in each direction from Lochmeath Way to the Puncheon Run Connector. The intent of this project is to implement safety improvements as identified under the Highway Safety Improvement Program and the Hazard Elimination Program. It will involve roadway widening, stormwater management facilities, multiple intersection redesigns, traffic signal reconfigurations and multi-modal improvements. Design and right-of-way acquisition are currently underway. Construction is anticipated to begin in 2024 and end in 2026.

The second active DelDOT project is *HEP, KC, US 13, Walnut Shade Road to Lochmeath Way* (State Project No. T201800201). This project seeks to widen US Route 13 to provide a third through lane in each direction from Walnut Shade Road to Lochmeath Way. The intent of this project is to implement safety improvements as identified under the Highway Safety Improvement Program and the Hazard Elimination Program. Design and right-of-way acquisition are currently underway. Construction is anticipated to begin in 2026 and end in 2027.

The third active DelDOT project is *East Camden Bypass* (State Project No. T201709503). This project is part of the Camden Bypass Study and is included in the Town of Camden's Comprehensive Plan. It is intended to improve safety and reduce traffic congestion along SR 10 through the Town of Camden and improve traffic operations at the US Route 13 & SR 10 intersection. DelDOT seeks to achieve improved safety and reduced traffic congestion by providing a new connection from US Route 13 to Lebanon Road (SR 10) and Rising Sun Road. Design and right-of-way acquisition are underway. Construction is anticipated to begin in 2023 and end in 2025.

The fourth active DelDOT project is *West Camden Bypass* (State Project No. T201709502). The continuation of the East Camden Bypass project described above, this project is part of the Camden Bypass Study and is included in the Town of Camden's Comprehensive Plan. It is intended to improve safety and reduce traffic congestion along SR 10 through the Town of Camden and improve traffic operations at the US Route 13 & SR 10 and US Route 13 & Old North Road intersections. DelDOT seeks to achieve improved safety and reduced traffic congestion by providing a new connection from Willow Grove Road and from South Street through S. Main Street to US Route 13 where it would tie into the proposed East Camden Bypass. Design and right-of-way acquisition are underway. Construction is anticipated to begin in 2023 and end in 2025.



Based on our review, we have the following comments and recommendations:

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Voshells Mill Road and Upper King Road / S. Main Street	Unsignalized	2023 without development weekday PM (Case 2); 2023 with development weekday AM and PM (Case 3)
S. Main Street and Old North Road	Signalized	2021 existing AM/PM/Saturday (Case 1); 2023 without development AM/PM/Saturday (Case 2); 2023 with development AM/PM/Saturday (Case 3)
Upper King Road and Lochmeath Way	Unsignalized	2023 without development weekday PM (Case 2); 2023 with development weekday PM (Case 3);
US Route 13 and Voshells Mill Road / Voshells Mill Star Hill Road	Signalized	2021 existing AM and PM (Case 1); 2023 without development AM/PM/Saturday (Case 2); 2023 with development AM/PM/Saturday (Case 3)
DE Route 10 and Rising Sun Road	Unsignalized	2021 existing AM and PM (Case 1); 2023 without development AM and PM (Case 2); 2023 with development AM and PM (Case 3)
US Route 13 and Barney Jenkins Road	Unsignalized	2021 existing AM/PM/Saturday (Case 1); 2023 without development AM/PM/Saturday (Case 2); 2023 with development AM/PM/Saturday (Case 3)

Access Issues and Recommendation

The Royal Farms development proposes a full access driveway on Voshells Mill Road approximately 150 feet west of the signal at US Route 13 and a right-in/right-out access driveway on US Route 13 less than 200 feet south of the signal at Voshells Mill Road. DelDOT’s *HEP, KC, US 13, Lochmeath Way to Puncheon Run Connector* project will modify the entire length of both the Voshells Mill Road and the US Route 13 frontages of the subject site and the adjacent signalized intersection. With these modifications, these accesses will not be feasible.

Voshells Mill Road is being widened to include a third lane on the eastbound approach to the signal. Factoring in the anticipated queues, we have significant safety and operational concerns about allowing left-turn movements at the proposed Royal Farms access on Voshells Mill Road. Additionally, there is no frontage or right-of-way on Voshells Mill Road to permit a proper right-turn lane into the site.

On US Route 13, a third southbound lane, a bike lane and a pedestrian path are being added in front of the site. Between those changes and the proximity of the access to the upstream signal, there would not be room for a properly-sized deceleration lane. In addition to those specific concerns, US Route 13 is one of DelDOT’s Corridor Capacity Preservation Program (CCPP)



corridors, and DelDOT has determined that a right-turn lane into the site at this exact location with as much volume as the Royal Farms would generate is not compatible with the goals of the CCPP as stated on page 1.

In light of everything described in the immediately preceding paragraphs, we find that the proposed accesses are not feasible and we recommend that the developer coordinate with DelDOT regarding pursuing acquisition under the CCPP.

Given this recommendation, we have no further comments on the deficient intersections listed on page 3 nor on any roadway improvements or other items that the developer should complete for this project.

Additional details on our review of this TIS are attached. Please contact me at (610) 640-3500 or through e-mail at ajparker@mccormicktaylor.com if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.

A handwritten signature in black ink, appearing to read "Andrew J. Parker".

Andrew J. Parker, PE, PTOE
Project Manager

Enclosure

General Information

Report date: January 27, 2022

Prepared by: Traffic Planning and Design, Inc.

Prepared for: Royal Farms

Tax parcel: 7-00-09415-04-0201-00001

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed Royal Farms development consists of a 4,649 square-foot super-convenience store with gas. The Royal Farms would replace two existing retail buildings totaling 10,400 square feet.

Location: The site is located at the southwestern corner of the intersection of US Route 13 (S. DuPont Hwy) & Voshells Mill Road (Kent Road 105) / Voshells Mill Star Hill Road (Kent Road 360) in Kent County, Delaware. A site location map is included on page 6.

Amount of land to be developed: approximately 2.03 acre parcel

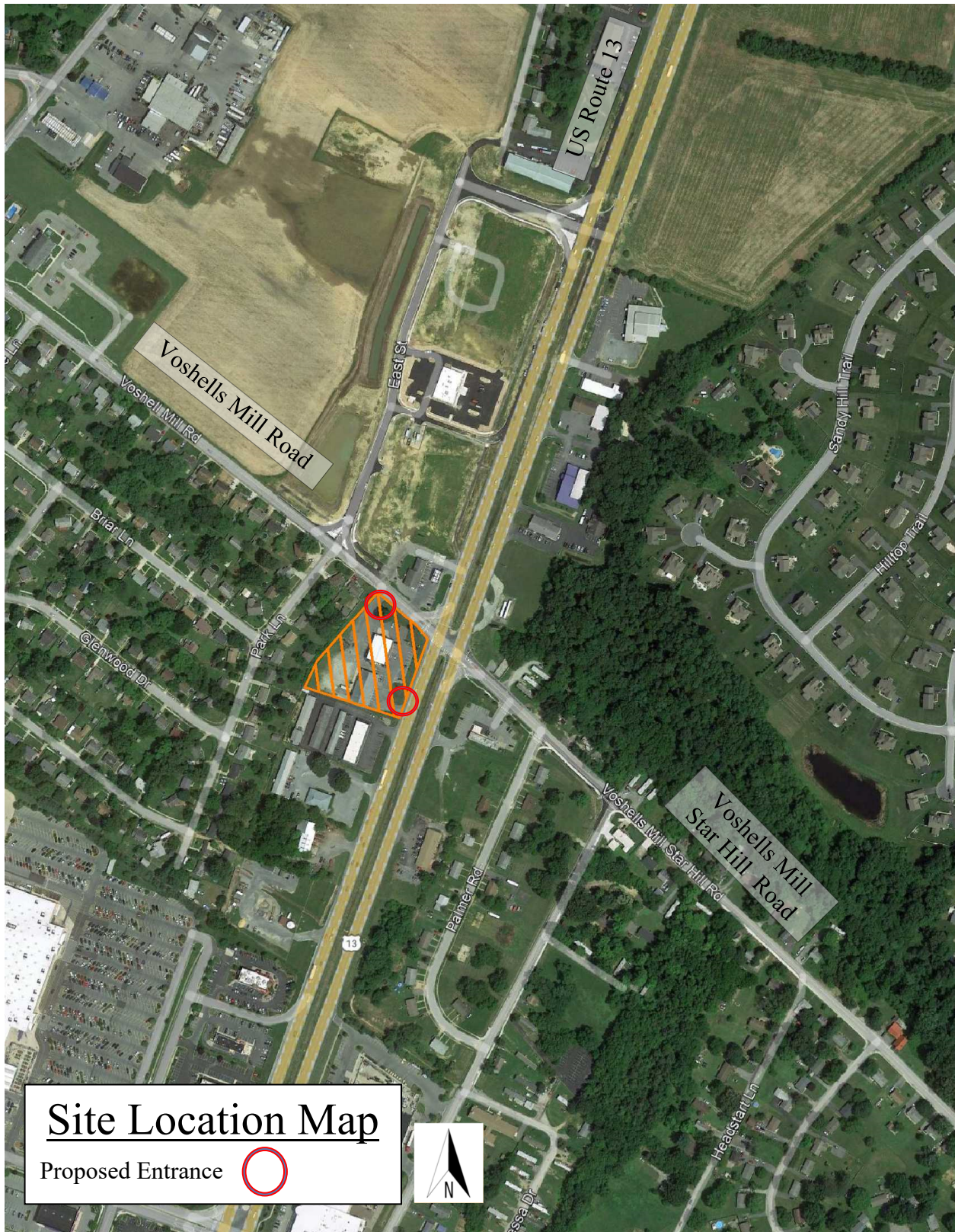
Land use approval(s) needed: Subdivision approval. The subject land is zoned BG (General Business) and the developer does not plan to rezone the land.

Proposed completion year: 2023

Proposed access locations: Two access points are proposed: one full access on Voshells Mill Road and one rights-in/rights-out access on southbound US Route 13.

Daily Traffic Volumes (per DelDOT Traffic Summary 2019):

- 2019 Average Annual Daily Traffic on Voshells Mill Road: 3,433 vehicles/day
- 2019 Average Annual Daily Traffic on US Route 13: 32,379 vehicles/day



Site Location Map

Proposed Entrance 



2020 Delaware Strategies for State Policies and Spending

Location with respect to the Strategies for State Policies and Spending Map of Delaware:

The proposed Royal Farms Store development is located within Investment Level 1.

Investment Level 1

Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. There are a variety of transportation opportunities available. Buildings may have mixed uses, such as a business on the first floor and apartments above.

In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the State's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas. These areas would be a prime location for designating "pre-permitted areas" to help steer development where the local government and citizens are most prepared to accept it.

Proposed Development's Compatibility with Strategies for State Policies and Spending:

The proposed Royal Farms Store development falls within Investment Level 1 and is to be developed as super-convenience store with gas pumps. The proposed development is consistent with the character of Investment Level 1. It is therefore concluded that the proposed development appears to generally comply with the policies stated in the 2020 "Strategies for State Policies and Spending."

Comprehensive Plan

Kent County Comprehensive Plan:

(Source: Kent County Comprehensive Plan, adopted September 2018)

The Kent County Comprehensive Plan Future Land Use Map indicates that the proposed Royal Farms site is planned for "Highway Commercial" land use. It would appear that the proposed development fits within the intended land use for this location.

Proposed Development's Compatibility with Comprehensive Plan:

The proposed development appears to comply with the Kent County Comprehensive Plan. The Royal Farms is proposed on land that is planned for Highway Commercial use. The land is zoned as BG (General Business); and the developers are not seeking to re-zone.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, there is one corridor capacity program and four active DelDOT Capital projects within the study area. None of the projects are expected to be constructed before the Royal Farms would be completed.

The corridor capacity program is DelDOT's Corridor Capacity Preservation Program (CCPP), a statewide program intended to sustain the through capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, including this section of US Route 13, are able to efficiently carry regional traffic without impedance from the effects of local development. The first two active projects below (the HEP projects) are tied to goals of the CCPP.

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Street to US Route 13 where it would tie into the proposed East Camden Bypass. Design and right-of-way acquisition are underway. Construction is anticipated to begin in 2023 and end in 2025.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Tenth Edition, published by the Institute of Transportation Engineers (ITE). The following land use was utilized to estimate the amount of new traffic generated for this development:

- 4,649 square-foot Super C-Store with Gas (ITE Land Use Code 960)
- 10,400 square-foot retail store to be replaced (ITE Land Use Code 820)

**Table 1
Royal Farms Peak Hour Trip Generation**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Midday		
	In	Out	Total	In	Out	Total	In	Out	Total
Prop. 4,649 sf Super C-Store w/ Gas	194	193	387	161	161	322	149	148	297
Pass-By Trips	147	147	294	123	123	246	98	98	196
Subtotal (added)	47	46	93	38	38	76	51	50	101
Existing 10,400 sf Retail Store to be removed	6	4	10	19	21	40	24	23	47
Pass-By Trips	0	0	0	7	7	14	6	6	12
Subtotal (removed)	6	4	10	12	14	26	18	17	35
NET TOTAL NEW TRIPS	41	42	83	26	24	50	33	33	66

Overview of TIS

Intersections examined:

- 1) Site Entrance A & Voshells Mill Road
- 2) Site Entrance B & US Route 13
- 3) Voshells Mill Road & Upper King Road/S. Main Street
- 4) DE Route 10 & S. Main Street
- 5) S. Main Street & Old North Road
- 6) Upper King Road & Lochmeath Way
- 7) Upper King Road & Bison Road
- 8) US Route 13 & Voshells Mill Road/Voshells Mill Star Hill Road
- 9) US Route 13 & DE Route 10
- 10) DE Route 10 & Rising Sun Road
- 11) US Route 13 & Old North Road
- 12) Voshells Mill Star Hill Road & Peachtree Run
- 13) Lochmeath Way & Voshells Mill Star Mill Road
- 14) US Route 13 & Lochmeath Way
- 15) Lochmeath Way & Peachtree Run

- 16) US Route 13 & Walnut Shade Road
- 17) US Route 13 & Barney Jenkins Road

Conditions examined:

- 1) 2021 Existing (Case 1)
- 2) 2023 without Royal Farms development (Case 2)
- 3) 2023 with Royal Farms development
 - a. Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)
 - b. Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)

Peak hours evaluated: Weekday morning and evening peak hours, Saturday midday peak hour

Committed developments considered:

- 1) King Property – Out parcels: 36,170 sf retail, 3,200 sf drive-in bank, 9,000 sf High turnover sit down restaurant (occupied), 3,234 sf fast-food restaurant with drive-thru windows
- 2) King Property – Residential: 192 units of mid-rise multi-family housing (48 occupied)
- 3) Long Acre Village: three 5,000 sf fast-food restaurants with drive-thru windows (fully constructed and occupied)
- 4) Townsend Fields: 106 single-family detached houses (89 occupied)
- 5) Brookfield Phase IV: 105 single-family detached houses (10 occupied)
- 6) Sunset Village: 240 units of mid-rise multi-family housing
- 7) Newells Creek: 204 single-family detached houses and 80 townhouses (fully constructed and occupied)
- 8) Camden Town Center: 204,167 sf discount superstore, 70,987 sf strip foot shopping center, 16 fueling position service station, 12-stall self-service car wash, 5,000 sf high-turnover sit-down restaurant, 4,000/ sf fast-food restaurant, 5,000 sf fast-food restaurant (fully constructed and occupied)
- 9) Camden Station: 17,000 sf retail store (fully constructed and occupied)
- 10) Kimco Development: 80,000 sf shopping center – sold to State of Delaware, will be rezoned and a stormwater retention pond will be constructed.
- 11) Cooper Property: 144,000 sf retail and 156 townhouses – development is on hold.

Intersection Descriptions

1) Site Entrance A & Voshells Mill Road

Type of Control: proposed unsignalized full-access driveway

Eastbound Approach: (Voshells Mill Road) proposed one shared through/right-turn lane

Westbound Approach: (Voshells Mill Road) proposed one left-turn lane and one through lane

Northbound Approach: (Site Entrance) proposed one shared left/right-turn lane, stop-controlled

2) Site Entrance B & US Route 13

Type of Control: proposed unsignalized right-in/right-out driveway

Eastbound Approach: (Site Entrance) proposed right-in/right-out driveway, stop-controlled

Southbound Approach: (US Route 13) existing two through lanes (divided highway), proposed two through lanes and one right-turn lane

3) Voshells Mill Road & Upper King Road/S. Main Street

Type of Control: minor stop-controlled T-intersection

Westbound Approach: (Voshells Mill Road) shared left/right-turn lane, stop controlled

Northbound Approach: (Upper King Road) shared through/right-turn lane

Southbound Approach: (S. Main Street) shared through/left-turn lane

4) DE Route 10 & S. Main Street

Type of Control: signalized 4-legged intersection

Eastbound Approach: (DE Route 10) shared left/through/right-turn lane

Westbound Approach: (DE Route 10) shared left/through/right-turn lane

Northbound Approach: (S. Main Street) shared left/through/right-turn lane

Southbound Approach: (S. Main Street) shared left/through/right-turn lane

5) S. Main Street & Old North Road

Type of Control: signalized 4-legged intersection

Eastbound Approach: (Old North Road) shared through/right-turn lane and a dedicated left-turn lane

Westbound Approach: (Old North Road) shared through/right-turn lane and a dedicated left-turn lane

Northbound Approach: (S. Main Street) shared through/left-turn lane and a dedicated right-turn lane

Southbound Approach: (S. Main Street) shared through/left-turn lane and a dedicated right-turn lane

6) Upper King Road & Lochmeath Way

Type of Control: minor stop-controlled T-intersection

Westbound Approach: (Lochmeath Way) shared right-turn/left-turn lane, stop-controlled

Northbound Approach: (Upper King Road) shared through/right-turn lane

Southbound Approach: (Upper King Road) shared through/left-turn lane

7) Upper King Road & Bison Road

Type of Control: minor stop-controlled T-intersection

Eastbound Approach: (Bison Road) shared right-turn/left-turn lane, stop-controlled

Northbound Approach: (Upper King Road) shared through/left-turn lane

Southbound Approach: (Upper King Road) shared through/right-turn lane

8) US Route 13 & Voshells Mill Road/Voshells Mill Star Hill Road

Type of Control: signalized 4-legged intersection

Eastbound Approach: (Voshells Mill Star Hill Road) shared through/left-turn lane and a dedicated right-turn lane

Westbound Approach: (Voshells Mill Star Hill Road) shared through/left-turn lane and a dedicated right-turn lane

Northbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a channelized right-turn lane

Southbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a channelized right-turn lane

9) US Route 13 & DE Route 10

Type of Control: signalized 4-legged intersection

Eastbound Approach: (DE Route 10) dedicated left-turn lane, two through lanes, and a channelized right-turn lane

Westbound Approach: (DE Route 10) dual left-turn lanes, one through lane, and a channelized right turn lane

Northbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a channelized right-turn lane

Southbound Approach: (US Route 13) dual left-turn lanes, two through lanes, and a dedicated right turn lane

10) DE Route 10 & Rising Sun Road

Type of Control: minor stop-controlled T-intersection

Eastbound Approach: (DE Route 10) left-turn/U-turn lane, two through lanes, and a channelized right-turn lane

Westbound Approach: (DE Route 10) left-turn/U-turn lane and two through lanes

Northbound Approach: (Rising Sun Road) dedicated left turn lane and a channelized right-turn lane

11) US Route 13 & Old North Road

Type of Control: signalized 3-legged intersection

Eastbound Approach: (Old North Road) dual-left turn lanes and a channelized right-turn lane

Northbound Approach: (US Route 13) two through lanes and a dedicated left-turn lane

Southbound Approach: (US Route 13) two through lanes and a dedicated right-turn lane

12) Voshells Mill Star Hill Road & Peachtree Run

Type of Control: minor stop-controlled T-intersection

Eastbound Approach: (Voshells Mill Star Hill Road) shared through/right-turn lane

Westbound Approach: (Voshells Mill Star Hill Road) shared through/left-turn lane

Northbound Approach: (Peachtree Run) shared right-turn/left-turn lane, stop-controlled

13) Lochmeath Way & Voshells Mill Star Hill Road

Type of Control: minor stop-controlled T-intersection

Eastbound Approach: (Lochmeath Way) shared through/left-turn lane

Westbound Approach: (Lochmeath Way) shared through/right-turn lane

Southbound Approach: (Voshells Mill Star Hill Road) shared right-turn/left-turn lane, stop-controlled

14) US Route 13 & Lochmeath Way

Type of Control: signalized 4-legged intersection

Eastbound Approach: (Lochmeath Way) dedicated left-turn lane, shared through/left-turn lane, and a channelized right-turn lane

Westbound Approach: (Lochmeath Way) shared through/left-turn lane and a channelized right-turn lane

Northbound Approach: (US Route 13) dedicated left-turn lane, two through lanes and a channelized right-turn lane.

Southbound Approach: (US Route 13) dedicated left-turn lane, two through lanes and a channelized right-turn lane.

15) Lochmeath Way & Peachtree Run

Type of Control: all-way stop-controlled intersection

Eastbound Approach: (Lochmeath Way) shared left-turn/through/right-turn lane

Westbound Approach: (Lochmeath Way) shared left-turn/through/right-turn lane

Northbound Approach: (Peachtree Run) shared left-turn/through/right-turn lane

Southbound Approach: (Peachtree Run) shared left-turn/through/right-turn lane

16) US Route 13 & Walnut Shade Road

Type of Control: signalized 4-legged intersection

Eastbound Approach: (Walnut Shade Road) shared through/left-turn lane, dedicated right-turn lane

Westbound Approach: (Walnut Shade Road) shared through/left-turn lane, dedicated right-turn lane

Northbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a dedicated right-turn lane

Southbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a dedicated right-turn lane

17) US Route 13 & Barney Jenkins Road

Type of Control: minor-stop controlled intersection

Eastbound Approach: (Barney Jenkins Road) shared left-turn/through/right-turn lane, stop-controlled

Westbound Approach: (Barney Jenkins Road) shared left-turn/through/right-turn lane, stop-controlled

Northbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a dedicated right-turn lane

Southbound Approach: (US Route 13) dedicated left-turn lane, two through lanes, and a dedicated right-turn lane

Safety Evaluation

Crash Data: Delaware Crash Analysis Reporting System (CARS) data was provided in the TIS for the three-year time period beginning 09/08/2018 to 09/09/2021. Crashes were tabulated within one-tenth of a mile for each intersection. A total of 491 reportable crashes occurred within the study area during the three-year period, with 114 (23%) of those crashes deemed correctable. The developer has identified six signalized intersections where crashes were concentrated and identified that the correctable crashes were predominantly “failed to yield” or “running red light crashes”. Their recommendation is to investigate if the installation of red-light cameras and the removal of yield signs along the right turn lane approaches is warranted for the identified signalized intersections. In addition, we note that all four intersections that had five or more correctable crashes over the course of one calendar year will each be improved by one of DelDOT’s planned capital projects described previously in this letter.

Sight Distance: The study area near the proposed Royal Farms generally consists of relatively straight and flat roadways and there are few visual obstructions. Sight distance appears adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data. As always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site accesses.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Based on the current DART Bus Stop Map, the Delaware Transit Corporation (DTC) does currently operate fixed-route transit bus services in the area of the proposed Royal Farms development. Route 104 runs along US Route 13 and Voshells Mill Road and makes several stops in Camden to the north and south of the proposed site. Route 117 runs between Harrington and Camden, and travels past the site on US Route 13. There are currently no existing bus stops adjacent to the site frontage, although there is a stop on Voshells Mill Road on the west side of Park Lane just west of the site frontage.

Planned transit service: Based on coordination with DTC representative Jared Kaufmann, no planned changes to nearby transit routes were indicated. DTC does not request any added or upgraded stops, but does request pedestrian pathways along the US Route 13 and Voshells Mill Road site frontages along with pedestrian access into the site.

Existing bicycle and pedestrian facilities: The following study area roadways are identified as “Bicycling Routes” on the *Kent County Bicycle Map* published by DelDOT:

- US Route 13
 - Connector Bicycle Route with Bikeway
 - Over 5,000 vehicles daily
 - Challenging for riders
- Voshells Mill Road
 - Connector Bicycle Route
- Peachtree Road
 - Connector Bicycle Route

- Upper King Road
 - Connector Bicycle Route with Bikeway
 - Over 5,000 vehicles daily

There are pedestrian curb ramps, ped signals and crosswalks at the intersection of US Route 13 and Voshells Mill Road, with sidewalks located at the southeast corner of the intersection. However, there are no sidewalk connections to the proposed site on the southwest corner. There are no bicycle lanes in the immediate vicinity of the site.

Planned bicycle and pedestrian facilities: Based on coordination with Mr. Anthony Aglio, of DelDOT's Statewide and Regional Planning Section, it is recommended to install sidewalk along the site frontage on Voshells Mill Road, and to install a multi-use path along the site frontage on US Route 13. In addition, bike lanes along US Route 13, upgrades to the pedestrian crossings and push buttons at the signalized intersection of US Route 13 & Voshells Mill Road, and installation of sidewalk along the proposed site frontages, are being proposed via the HEP, KC, US Route 13, Lochmeath Way to Puncheon Run DelDOT Project. DART also recommends a pedestrian pathway along the frontage of both US Route 13 and Voshells Mill Road, as well as bicycle racks for cyclists to park on the site. The proposed site will provide bicycle racks; however, no pedestrian facilities are proposed along the frontage of the property prior to the DelDOT HEP project coming through.

Previous Comments

In a review letter dated December 28, 2021, DelDOT indicated that the revised Preliminary TIS was acceptable as submitted, with two changes which were made when submitting the Final TIS.

It appears that all substantive comments from DelDOT's TIS Scoping Memorandum, Traffic Count Review, Preliminary TIS Review, and other correspondence were addressed in the Final TIS submission.

General Analysis Comments

(see table footnotes on the following pages for specific comments)

- 1) Both TPD and McCormick Taylor utilized Synchro traffic analysis software and reported HCM 6th Edition based analysis results.
- 2) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.

Table 2
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Site Entrance A & Voshells Mill Road						
2021 Existing (Case 1)						
Site Access A	B (10.3)	B (11.2)	B (10.2)	B (10.4)	B (11.4)	B (10.4)
Westbound Voshells Mill Road - Lefts	A (7.8)	A (8.0)	A (7.8)	A (7.8)	A (8.0)	A (7.7)
2023 without Royal Farms (Case 2)						
Site Access A	B (10.5)	B (11.4)	B (10.5)	B (10.6)	B (11.7)	B (10.6)
Westbound Voshells Mill Road - Lefts	A (7.9)	A (8.1)	A (7.8)	A (7.9)	A (8.1)	A (7.8)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Site Access A	B (13.1)	B (13.6)	B (11.9)	B (13.3)	B (13.8)	B (12.0)
Westbound Voshells Mill Road - Lefts	A (8.1)	A (8.2)	A (7.9)	A (8.1)	A (8.2)	A (7.9)
Case 3A with Capital Project						
Site Access A	B (13.1)	B (13.6)	B (11.9)	C (15.4)	C (15.4)	B (13.1)
Westbound Voshells Mill Road - Lefts	A (8.1)	A (8.2)	A (7.9)	A (8.3)	A (8.4)	A (8.1)
Case 3A with Capital Project w/ No WB lefts in from Voshells Mill Rd						
Site Access A	N/A	N/A	N/A	B (12.4)	B (13.0)	B (11.4)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Site Access A	C (15.2)	C (15.2)	B (13.0)	C (15.4)	C (15.4)	B (13.1)
Westbound Voshells Mill Road - Lefts	A (8.3)	A (8.4)	A (8.1)	A (8.3)	A (8.4)	A (8.1)
Case 3B with Capital Project						
Site Access A	C (15.2)	C (15.2)	B (13.0)	C (15.4)	C (15.4)	B (13.1)
Westbound Voshells Mill Road - Lefts	A (8.3)	A (8.4)	A (8.1)	A (8.3)	A (8.4)	A (8.1)

¹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 3
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ² One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Site Entrance B & US Route 13						
2021 Existing (Case 1)						
Site Access B	B (10.0)	B (13.0)	B (11.3)	B (12.8)	C (18.7)	C (15.7)
2023 without Royal Farms (Case 2)						
Site Access B	B (10.3)	B (14.0)	B (11.9)	B (13.2)	C (20.3)	C (16.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Site Access B	B (10.6)	C (15.0)	B (12.2)	B (14.6)	C (23.5)	C (18.5)
Case 3A with Capital Project						
Site Access B	B (10.5)	B (12.2)	B (11.2)	C (15.7)	D (26.2)	C (20.4)
Case 3A with Capital Project w/ No WB lefts in from Voshells Mill Rd						
Site Access B	N/A	N/A	N/A	C (16.4)	C (23.5)	C (18.6)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Site Access B	B (10.6)	C (15.0)	B (12.2)	B (14.0)	C (22.6)	C (18.5)
Case 3B with Capital Project						
Site Access B	B (10.5)	B (12.2)	B (11.2)	C (15.4)	C (15.4)	C (20.4)

² For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 4
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ³ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Voshells Mill Road & Upper King Road/S. Main Street						
2021 Existing (Case 1)						
Westbound Voshells Mill Road	C (22.8)	D (31.9)	C (18.5)	C (22.8)	D (31.9)	C (18.5)
Southbound Upper King Road/S. Main Street - Lefts	A (9.8)	A (9.2)	A (8.7)	A (9.8)	A (9.2)	A (8.7)
2023 without Royal Farms (Case 2)						
Westbound Voshells Mill Road	D (29.0)	F (54.1)	C (23.8)	D (29.0)	F (54.1)	C (23.8)
Southbound Upper King Road/S. Main Street - Lefts	B (10.0)	A (9.4)	A (8.8)	B (10.0)	A (9.4)	A (8.8)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Westbound Voshells Mill Road	E (35.9)	F (70.4)	D (27.1)	E (35.9)	F (70.4)	D (27.1)
Southbound Upper King Road/S. Main Street - Lefts	B (10.1)	A (9.4)	A (8.9)	B (10.1)	A (9.4)	A (8.9)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Westbound Voshells Mill Road	E (35.9)	F (70.4)	D (27.1)	E (35.9)	F (70.4)	D (27.1)
Southbound Upper King Road/S. Main Street - Lefts	B (10.1)	A (9.4)	A (8.9)	B (10.1)	A (9.4)	A (8.9)

³ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 5
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ⁴	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
DE Route 10 & S. Main Street						
2021 Existing (Case 1)	B (13.7)	B (16.8)	B (13.1)	B (17.6)	C (22.1)	B (14.7)
2023 without Royal Farms (Case 2)	B (14.3)	B (17.4)	B (13.4)	B (19.1)	C (24.1)	B (15.3)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	B (14.5)	B (17.5)	B (13.5)	B (19.7)	C (24.6)	B (15.4)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	B (14.5)	B (17.5)	B (13.5)	B (19.7)	C (24.6)	B (15.4)

⁴ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 6
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ⁵	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
S. Main Street & Old North Road						
2021 Existing (Case 1)	E (72.9)	E (78.3)	F (80.6)	F (89.7)	F (93.9)	F (95.1)
2023 without Royal Farms (Case 2)	E (73.3)	E (79.9)	F (81.9)	F (90.4)	F (94.1)	F (96.6)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	E (73.6)	E (80.0)	F (82.2)	F (90.8)	F (94.3)	F (97.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	E (73.6)	E (80.0)	F (82.2)	F (90.8)	F (94.3)	F (97.0)

⁵ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 7
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ⁶ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Upper King Road & Lochmeath Way						
2021 Existing (Case 1)						
Westbound Lochmeath Way	B (12.8)	D (29.1)	B (14.6)	B (12.8)	D (29.1)	B (14.6)
Southbound Upper King Road - Lefts	A (8.2)	A (8.1)	A (7.9)	A (8.2)	A (8.1)	A (7.9)
2023 without Royal Farms (Case 2)						
Westbound Lochmeath Way	B (13.8)	E (47.5)	C (16.9)	B (13.8)	E (47.5)	C (16.9)
Southbound Upper King Road - Lefts	A (8.3)	A (8.2)	A (8.0)	A (8.3)	A (8.2)	A (8.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Westbound Lochmeath Way	B (13.8)	E (48.7)	C (17.1)	B (13.8)	E (48.7)	C (17.1)
Southbound Upper King Road - Lefts	A (8.3)	A (8.2)	A (8.0)	A (8.3)	A (8.2)	A (8.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Westbound Lochmeath Way	B (13.8)	E (48.7)	C (17.1)	B (13.8)	E (48.7)	C (17.1)
Southbound Upper King Road - Lefts	A (8.3)	A (8.2)	A (8.0)	A (8.3)	A (8.2)	A (8.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A) <i>With Improvement Option 1</i> ⁷						
Westbound Lochmeath Way	N/A	N/A	N/A	B (12.7)	D (34.3)	C (15.2)
Southbound Upper King Road - Lefts	N/A	N/A	N/A	A (8.3)	A (8.2)	A (8.0)

⁶ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁷ Improvement Option 1 consists of adding a separate right-turn lane on the westbound Lochmeath Way approach, such that it would have one left-turn lane and one right-turn lane.

Table 8
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ⁸ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Upper King Road & Bison Road						
2021 Existing (Case 1)						
Eastbound Bison Road	B (12.5)	C (17.2)	B (12.9)	B (12.5)	C (17.2)	B (12.9)
Northbound Upper King Road - Lefts	A (7.6)	A (9.0)	A (7.9)	A (7.6)	A (9.0)	A (7.9)
2023 without Royal Farms (Case 2)						
Eastbound Bison Road	B (13.3)	C (19.6)	B (14.1)	B (13.3)	C (19.6)	B (14.1)
Northbound Upper King Road - Lefts	A (7.6)	A (9.2)	A (8.0)	A (7.6)	A (9.2)	A (8.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Eastbound Bison Road	B (13.5)	C (19.6)	B (14.2)	B (13.5)	C (19.6)	B (14.2)
Northbound Upper King Road - Lefts	A (7.6)	A (9.2)	A (8.0)	A (7.6)	A (9.2)	A (8.0)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Eastbound Bison Road	B (13.5)	C (19.6)	B (14.2)	B (13.5)	C (19.6)	B (14.2)
Northbound Upper King Road - Lefts	A (7.6)	A (9.2)	A (8.0)	A (7.6)	A (9.2)	A (8.0)

⁸ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 9
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ⁹	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & Voshells Mill Road / Voshells Mill Star Hill Road						
2021 Existing (Case 1)	D (39.9)	C (27.0)	C (27.1)	E (66.2)	E (65.0)	D (54.8)
2023 without Royal Farms (Case 2)	D (41.5)	C (24.1)	C (28.8)	E (63.7)	E (76.7)	E (57.2)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	D (42.7)	C (24.3)	C (29.0)	E (64.1)	E (72.1)	E (79.6)
Case 3A with Capital Projects	C (32.9)	B (18.1)	B (19.4)	D (40.4)	D (46.0)	D (44.2)
Case 3A with Capital Projects and no WB Lefts into Site Access A	N/A	N/A	N/A	D (40.2)	D (45.2)	D (42.9)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	D (42.8)	C (24.7)	C (29.5)	E (70.5)	E (71.9)	F (83.1)
Case 3B with Capital Projects	C (33.1)	B (18.5)	N/A	D (40.6)	D (45.0)	D (44.6)

⁹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 10
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ¹⁰	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & DE Route 10						
2021 Existing (Case 1)	D (35.7)	D (50.3)	D (46.0)	D (42.2)	D (51.3)	D (38.5)
2023 without Royal Farms (Case 2)	D (37.1)	D (52.5)	D (47.4)	D (50.5)	D (50.9)	D (39.3)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	D (37.3)	D (52.6)	D (47.5)	D (51.1)	D (51.3)	D (39.6)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	D (37.3)	D (52.6)	D (47.5)	D (51.1)	D (51.3)	D (39.6)

¹⁰ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 11
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹¹ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
DE Route 10 & Rising Sun Road						
2021 Existing (Case 1)						
Northbound Rising Sun Road	F (107.7)	F (51.5)	D (30.9)	F (107.7)	E (48.0)	D (30.2)
Westbound DE Route 10 - Lefts	A (8.6)	A (8.5)	A (8.1)	A (8.6)	A (8.5)	A (8.1)
2023 without Royal Farms (Case 2)						
Northbound Rising Sun Road	F (126.7)	F (60.3)	D (34.5)	F (119.5)	F (56.2)	D (33.7)
Westbound DE Route 10 - Lefts	A (8.6)	A (8.5)	A (8.1)	A (8.6)	A (8.5)	A (8.1)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Northbound Rising Sun Road	F (130.3)	F (61.5)	D (34.9)	F (122.9)	F (57.3)	D (34.1)
Westbound DE Route 10 - Lefts	A (8.6)	A (8.5)	A (8.1)	A (8.6)	A (8.5)	A (8.1)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Northbound Rising Sun Road	F (130.3)	F (61.5)	D (34.9)	F (122.9)	F (57.3)	D (34.1)
Westbound DE Route 10 - Lefts	A (8.6)	A (8.5)	A (8.1)	A (8.6)	A (8.5)	A (8.1)

¹¹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 12
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ¹²	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & Old North Road						
2021 Existing (Case 1)	B (14.5)	C (31.4)	C (21.4)	B (11.6)	B (17.7)	B (14.2)
2023 without Royal Farms (Case 2)	B (14.7)	C (32.0)	C (21.5)	B (11.5)	B (18.9)	B (14.3)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	B (14.8)	C (32.3)	C (22.0)	B (11.6)	B (19.0)	B (14.4)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	B (14.8)	C (32.3)	C (22.0)	B (11.6)	B (19.0)	B (14.4)

¹² For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 13
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹³ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Voshells Mill Star Hill Road & Peachtree Run						
2021 Existing (Case 1)						
Northbound Peachtree Run	B (11.7)	B (12.7)	B (10.9)	B (11.7)	B (12.7)	B (10.5)
Westbound Voshells Mill Star Hill Road - Lefts	A (7.5)	A (7.9)	A (7.7)	A (7.5)	A (7.9)	A (7.6)
2023 without Royal Farms (Case 2)						
Northbound Peachtree Run	B (11.9)	B (12.9)	B (11.1)	B (11.9)	B (12.9)	B (11.1)
Westbound Voshells Mill Star Hill Road - Lefts	A (7.5)	A (8.0)	A (7.7)	A (7.5)	A (8.0)	A (7.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Northbound Peachtree Run	B (12.1)	B (13.1)	B (11.2)	B (12.1)	B (13.1)	B (11.2)
Westbound Voshells Mill Star Hill Road - Lefts	A (7.5)	A (8.0)	A (7.7)	A (7.5)	A (8.0)	A (7.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Northbound Peachtree Run	B (12.1)	B (13.1)	B (11.2)	B (12.1)	B (13.1)	B (11.2)
Westbound Voshells Mill Star Hill Road - Lefts	A (7.5)	A (8.0)	A (7.7)	A (7.5)	A (8.0)	A (7.7)

¹³ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 14
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹⁴ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Lochmeath Way & Voshells Mill Star Mill Road						
2021 Existing (Case 1)						
Southbound Voshells Mill Star Mill Road	B (10.1)	B (11.0)	B (10.5)	B (10.1)	B (11.0)	B (10.5)
Eastbound Lochmeath Way - Lefts	A (7.7)	A (7.7)	A (7.6)	A (7.7)	A (7.7)	A (7.6)
2023 without Royal Farms (Case 2)						
Southbound Voshells Mill Star Mill Road	B (10.2)	B (11.3)	B (10.8)	B (10.2)	B (11.3)	B (10.8)
Eastbound Lochmeath Way - Lefts	A (7.7)	A (7.8)	A (7.7)	A (7.7)	A (7.8)	A (7.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Southbound Voshells Mill Star Mill Road	B (10.3)	B (11.4)	B (10.8)	B (10.3)	B (11.4)	B (10.8)
Eastbound Lochmeath Way - Lefts	A (7.8)	A (7.8)	A (7.7)	A (7.8)	A (7.8)	A (7.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Southbound Voshells Mill Star Mill Road	B (10.3)	B (11.4)	B (10.8)	B (10.3)	B (11.4)	B (10.8)
Eastbound Lochmeath Way - Lefts	A (7.8)	A (7.8)	A (7.7)	A (7.8)	A (7.8)	A (7.7)

¹⁴ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 15
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ¹⁵	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & Lochmeath Way						
2021 Existing (Case 1)	C (20.9)	C (29.6)	C (28.4)	C (22.1)	C (32.8)	C (31.1)
2023 without Royal Farms (Case 2)	C (23.7)	C (33.1)	C (31.1)	C (25.3)	D (36.8)	C (34.6)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	C (23.9)	C (33.2)	C (31.1)	C (25.5)	D (36.9)	C (34.7)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	C (23.9)	C (33.2)	C (31.1)	C (25.5)	D (36.9)	C (34.7)

¹⁵ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 16
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹⁶ Four-Way Stop Intersection	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
Lochmeath Way & Peachtree Run						
2021 Existing (Case 1)	A (9.8)	B (10.8)	A (9.6)	B (11.7)	B (10.8)	A (9.6)
2023 without Royal Farms (Case 2)	B (10.3)	B (12.1)	B (10.5)	B (10.3)	B (12.1)	B (10.5)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	B (10.4)	B (12.1)	B (10.5)	B (10.4)	B (12.1)	B (10.5)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	B (10.4)	B (12.1)	B (10.5)	B (10.4)	B (12.1)	B (10.5)

¹⁶ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 17
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Signalized Intersection ¹⁷	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & Walnut Shade Road						
2021 Existing (Case 1)	D (41.3)	D (43.2)	C (26.6)	D (46.8)	D (50.5)	C (28.4)
2023 without Royal Farms (Case 2)	D (43.2)	D (44.9)	C (28.3)	D (49.8)	D (53.4)	C (30.2)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)	D (43.5)	D (45.1)	C (28.4)	D (50.3)	D (53.7)	C (30.4)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)	D (43.5)	D (45.1)	C (28.4)	D (50.3)	D (53.7)	C (30.4)

¹⁷ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 18
Peak Hour Levels of Service (LOS)
Based on Royal Farms # 459 Traffic Impact Study – January 2022
Prepared by Traffic Planning and Design, Inc.

Unsignalized Intersection ¹⁸ Two-Way Stop Intersection	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
US Route 13 & Barney Jenkins Road						
2021 Existing (Case 1)						
Eastbound Barney Jenkins Road	E (43.0)	F (116.1)	E (37.8)	E (43.0)	F (116.1)	E (37.8)
Westbound Barney Jenkins Road	F (62.4)	F (131.2)	E (47.2)	F (62.4)	F (131.2)	E (47.2)
Northbound US Route 13 - Lefts	A (9.8)	B (13.2)	B (10.4)	A (9.8)	B (13.2)	B (10.4)
Southbound US Route 13 - Lefts	C (15.8)	B (10.4)	B (11.7)	C (15.8)	B (10.4)	B (11.7)
2023 without Royal Farms (Case 2)						
Eastbound Barney Jenkins Road	E (49.6)	F (149.7)	E (43.4)	E (49.6)	F (149.7)	E (43.4)
Westbound Barney Jenkins Road	F (76.7)	F (178.7)	F (55.4)	F (76.7)	F (178.7)	F (55.4)
Northbound US Route 13 - Lefts	B (10.1)	B (13.7)	B (10.6)	B (10.1)	B (13.7)	B (10.6)
Southbound US Route 13 - Lefts	C (16.5)	B (10.7)	B (12.1)	C (16.5)	B (10.7)	B (12.1)
2023 with Royal Farms Full access on Voshells Mill Road and right-in/right-out on US 13 (Case 3A)						
Eastbound Barney Jenkins Road	E (49.6)	F (149.7)	E (43.4)	E (49.6)	F (149.7)	E (43.4)
Westbound Barney Jenkins Road	F (76.7)	F (185.0)	F (56.8)	F (76.7)	F (185.0)	F (56.8)
Northbound US Route 13 - Lefts	B (10.2)	B (13.7)	B (10.7)	B (10.2)	B (13.7)	B (10.7)
Southbound US Route 13 - Lefts	C (16.5)	B (10.7)	B (12.2)	C (16.5)	B (10.7)	B (12.2)
2023 with Royal Farms Full access on Voshells Mill Road and right-out only on US 13 (Case 3B)						
Eastbound Barney Jenkins Road	E (49.6)	F (149.7)	E (43.4)	E (49.6)	F (149.7)	E (43.4)
Westbound Barney Jenkins Road	F (76.7)	F (185.0)	F (56.8)	F (76.7)	F (185.0)	F (56.8)
Northbound US Route 13 - Lefts	B (10.2)	B (13.7)	B (10.7)	B (10.2)	B (13.7)	B (10.7)
Southbound US Route 13 - Lefts	C (16.5)	B (10.7)	B (12.2)	C (16.5)	B (10.7)	B (12.2)

¹⁸ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.